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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,446	07/11/2006	Toshiki Origuchi	3273-0225PUS1	2164

2292 7590 12/01/2009
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EXAMINER

SALVITTI, MICHAEL A

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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12/01/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/581,446	Applicant(s) ORIGUCHI ET AL.	
	Examiner MICHAEL A. SALVITTI	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,320,769 to *Botnick et al.* in view of U.S. Patent No. 5,840,800 to *Joffre et al.*

Regarding claim 1: *Botnick* teaches a vinyl-urethane copolymer comprising at least one vinyl polymer chain and at least one urethane polymer chain (*Botnick* col. 2, lines 57-63). The two polymer chains are combined through an intermediary linkage segment (self-crosslinking; *Botnick* col. 2, line 64). This linkage segment is bonded to the vinyl chain and the urethane chain.

Botnick does not teach the linkage segment comprising a silicon oxygen bond. *Joffre* teaches organic polymers comprising silicon modified organic polymers (*Joffre* col. 4, lines 42-46). These polymers crosslink to form silicon-oxygen bonds between chains on the polymers (*Joffre* col. 9, lines 25-30). *Botnick* and *Joffre* are analogous art in that they are drawn to the same field of endeavor, namely aqueous dispersions of self-crosslinking vinyl polymers. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to substitute the reactive self-

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crosslinking sites in the polymers of *Botnick* with the reactive silyl groups (as taught by *Joffre*). The motivation in doing so is the creation of compositions showing elasticity upon drying (*Joffre* col. 1, lines 35-40) that have advantageous properties regarding shelf-life and toxicity (*Joffre* col. 3, lines 16-20).

Regarding claim 2: *Botnick* teaches the urethane polymer is a residue of a urethane polymer (A) having at least one reactive group (free hydroxyl groups of Example 1 - analogous to the silicon-containing group for the purposes of bonding the vinyl and urethane chains). The functionalized polyurethane polymer resins are mixed with functionalized vinyl resins (see *Botnick* col. 19, lines 35-53). The functionalized vinyl polymer is derived from an ethylenically unsaturated monomer (B) (methyl methacrylate) and a compound (C) (acetoacetoxyethyl methacrylate; see Example 11, col. 17, lines 5-20). Compound (C) is analogous to the silicon-containing monomer in the instant recited claim, in that the acetoacetoxyethyl undergoes crosslinking reactions with free anionic salt groups (deprotonated hydroxyls) on the functionalized polyurethane (*Botnick* col. 3, lines 14-22).

Regarding claims 3, 4 and 8: *Botnick* in view of *Joffre* teaches the composition of claim 1, as set forth above. *Botnick* teaches a crosslinking reaction occurring between acetoacetoxyethyl groups on the vinyl polymer with the free anionic salt groups on the functionalized polyurethane (*Botnick* col. 3, lines 14-22).

Botnick is silent regarding the linkage segment between the polymers as being silicon polymer chains. *Joffre* teaches crosslinking polymer chains with hydrolysable silicone moieties (*Joffre* col. 4, line 65 through col. 5, line) wherein crosslinking

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between the polymer chains is achieved through condensation of the hydrolysable silicone moieties (*Joffre* col. 14, lines 12-17). *Joffre* teaches silane compounds (D) as hydrolysable alkoxy-silylated groups (see claim 15). *Botnick* and *Joffre* are analogous art in that they are drawn to the same field of endeavor, namely aqueous dispersions of self-crosslinking vinyl polymers. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to substitute the reactive self-crosslinking sites in the polymers of *Botnick* with the reactive silyl groups (as taught by *Joffre*). The motivation in doing so is the creation of compositions showing elasticity upon drying (*Joffre* col. 1, lines 35-40) that have advantageous properties regarding shelf-life and toxicity (*Joffre* col. 3, lines 16-20).

Regarding claims 5-7: *Botnick* in view of *Joffre* teaches the composition of claim 2, as set forth above. *Botnick* teaches the urethane polymer (A) having the reactive group (analogous to the silicon group) further contains at least one monomer with a hydrophilic group (trimetholol propane; col. 12, line 10). The functional-modified urethane polymer (A1) contains a hydrophilic group (polyol from the Tone 210 Polyol). The (A1) urethane polymer comprises 2-methylpentamethylenediamine (A1-a), caprolactone diol (A1-b), 1,3-bis(1-isocyanato-1-methylethyl)benzene (A1-c), trimethylolpropane (A1-d, given broadest reasonable interpretation as being equivalent to the alkoxy-silyl since this the free hydroxyl crosslinks the polymers).

Botnick is silent regarding the reactive groups containing alkoxy-silation. *Joffre* teaches silane compounds as hydrolysable alkoxy-silylated groups (see claim 15). At the time of the invention, it would have been obvious to a person having ordinary skill in the

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art to incorporate hydrolysable alkoxysilyl groups as the crosslinking units in the polymers of *Botnick*, with the motivation of enabling crosslinking without the need of a crosslinker (*Joffre*, col. 9, lines 25-30), allowing for omission of the crosslinking agent and therefore the composition can be made at lower cost.

Botnick is silent regarding embodiments wherein the reactive groups are at the terminus of the polymer chains. *Joffre* teaches that reactive groups at the termini are desirable (col. 4, lines 49-53). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to incorporate reactive silyl groups into the termini of the functional polymers taught by *Botnick*, with the motivation of increasing the strength and elongation of the cured product (*Joffre*, col. 4, lines 49-53).

Regarding claims 9 and 10: *Botnick* teaches the vinyl as an acrylic (methyl methacrylate; Example 11, col. 17). The compound C having the reactive group (acetoacetoxyethyl methacrylate) also contains an ethylenically unsaturated bond (Example 11, col. 17). As above, the acetoacetoxyethyl methacrylate is responsible for crosslinking the polymers in this composition (*Botnick* col. 3, lines 14-22) and it has been examined as being an equivalent to the silyls of the instant claims, in terms of monomers and presence in the respective polymers.

Regarding claim 17: *Botnick* teaches the vinyl-urethane copolymer as an aqueous dispersion (col. 19, lines 35-53).

Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,320,769 to *Botnick et al.* in view of U.S. Patent No. 5,840,800 to *Joffre et al.*

Regarding claim 11: *Botnick* teaches a method for producing vinyl-urethane copolymer comprising at least one vinyl polymer chain and at least one urethane polymer chain (*Botnick* col. 2, lines 57-63). The two polymer chains are combined through an intermediary linkage segment (self-crosslinking; *Botnick* col. 2, line 64). This linkage segment is bonded to the vinyl chain and the urethane chain.

As to the method, *Botnick* teaches Step (X) wherein the urethane polymer with the reactive group is prepared (Example 1, col. 12), followed by (Y) polymerization of compounds B and C (methyl methacrylate and acetoacetoxyethyl methacrylate, respectively; Example 9, col. 16) during the polymerization reaction in the presence of the functionalized urethane (A) (see Example 35, col. 19).

Botnick does not teach the linkage segment comprising a silicon oxygen bond. *Joffre* teaches organic polymers comprising silicon modified organic polymers (*Joffre* col. 4, lines 42-46). These polymers crosslink to form silicon-oxygen bonds between chains on the polymers (*Joffre* col. 9, lines 25-30). *Botnick* and *Joffre* are analogous art in that they are drawn to the same field of endeavor, namely aqueous dispersions of self-crosslinking vinyl polymers. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to substitute the reactive self-crosslinking sites in the polymers of *Botnick* with the reactive silyl groups (as taught by *Joffre*). The motivation in doing so is the creation of compositions showing elasticity

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upon drying (*Joffre* col. 1, lines 35-40) that have advantageous properties regarding shelf-life and toxicity (*Joffre* col. 3, lines 16-20).

Regarding claim 12: *Botnick* in view of *Joffre* teaches the method of claim 11, as set forth above.

Botnick teaches Step (Y1-a) wherein a dispersion of functionalized polyurethane (A) is prepared, followed by simultaneously polymerizing B (methyl methacrylate) and C (acetoacetoxymethyl methacrylate); see Example 35, col. 19).

Regarding claim 13: *Botnick* in view of *Joffre* teaches the method of claim 11, as set forth above.

Botnick teaches Step (Y2-C) wherein a dispersion of functionalized polyurethane (A) is prepared, followed by polymerizing the vinyl emulsion of Example 9 (Example 35, col. 19). Monomers B and C are polymerized simultaneously during the polymerization reaction; the equivalent of the condensation reaction (crosslinking vinyl and urethane) occurs before the condensation (curing time is days (see Table VII, col. 26)).

Botnick is silent regarding hydrolysis of a silane compound (D) in this reaction. *Joffre* teaches crosslinking polymer chains with hydrolysable silicone moieties (*Joffre* col. 4, line 65 through col. 5, line) wherein crosslinking between the polymer chains is achieved through condensation of the hydrolysable silicone moieties (*Joffre* col. 14, lines 12-17). *Joffre* teaches silane compounds (D) as hydrolysable alkoxysilylated groups (see claim 15). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to substitute the reactive self-crosslinking sites in the polymers of *Botnick* with the reactive silyl groups (as taught by *Joffre*). The

motivation in doing so is the creation of compositions showing elasticity upon drying (*Joffre* col. 1, lines 35-40) that have advantageous properties regarding shelf-life and toxicity (*Joffre* col. 3, lines 16-20).

Regarding claim 14: *Botnick* teaches the reactive functional group compound (acetoxymethyl methacrylate in Example 9; analogous to the silane compound D) has at least one functional group reactive with an ethylenically unsaturated bond-containing group in combination with a silane compound free from a functional group reactive with an ethylenically unsaturated monomer (methyl methacrylate in Example 9).

Regarding claim 15: *Botnick* teaches an embodiment wherein ethylenically unsaturated monomer acts as a solvent during the preparation of the urethane polymer (Example 36, col. 20). This has been interpreted on the basis that some free monomer is present in Example 9 (col. 16, lines 56-57).

Regarding claim 16: *Botnick* teaches a method wherein the urethane polymer (A) having at least one silicon-containing hydrolysable group used in step (X) is a hydroxy-functionalized (equivalent to alkoxysilane) urethane polymer (A1) containing at least one hydrophilic group (Example 1 has both a hydrophilic group from polycaprolactone diol, and a free hydroxyl from trimethylolpropane).

Response to Arguments

The following responses are directed to the document entitled "Remarks" submitted on August 17th, 2009.

A) Applicant's arguments with respect to the rejection(s) of claim(s) 1 and 3 to *Lai* (Journal of Applied Polymer Science, 56, 301-310 (1995)) under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 5,541,251 to *Botnick* and U.S. Patent No. 5,840,800 to *Joffre*.

B) Applicant's arguments with respect to claims 1-10 to WO/0301865 to *Schindler* under 102(b) have been considered but are moot in view of the new ground(s) of rejection.

C) Applicant's arguments with respect to claims 11-16 to WO/0301865 (*Schindler*), U.S. Patent No. 6,031,041 (*Chung*) and U.S. Patent No. 5,854,332 (*Swarup*) under 103(a) have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. SALVITTI whose telephone number is (571)270-7341. The examiner can normally be reached on Monday-Thursday 8AM-7PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/
Supervisory Patent Examiner, Art Unit 1796

/M. A. S./
Examiner, Art Unit 1796